

**CLAIMS**

1. A communication system comprising:

5 a multicast-capable router including

a forwarding destination holder for holding a forwarding address to which a multicast-capable router forwards a multicast packet,

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a forwarding destination register for registering an address of another multicast-capable router in the forwarding destination holder as the forwarding address while the address is associated with a source terminal address and a multicast group address, and

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a router message provider for providing the source terminal address with a join request message which requests addition of the address of the multicast-capable router to a sending address to which the source terminal transmits the multicast packet; and

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a source terminal including

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a sending destination holder for holding the sending address, and

a sending destination register for registering the address of the multicast-capable router in the sending destination holder as the sending address based on the join request message.

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2. The communication system according to claim 1, wherein the sending destination register registers, in the sending destination holder, the address of the multicast-capable router located most upstream when the source terminal address is assumed to be upstream in a multicast tree.

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3. The communication system according to claim 1, wherein

the multicast-capable router includes a judgment section for judging whether or not to be a branch router which forwards the multicast packets to the plurality of forwarding addresses when the source terminal address is assumed to be upstream in the multicast tree,

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the forwarding destination register registers, in the forwarding destination register, the plurality of forwarding addresses associated with the source terminal address and the multicast group address, when having judged that the multicast-capable router is to be a branch router,

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the router message provider provides the source terminal address with a join/leave request message which requests

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addition of the address of the multicast-capable router to the sending address and deletion of the forwarding address from the sending address, when having judged that the multicast-capable router is to be a branch router, and

the sending destination register deletes the forwarding address from the sending destination holder based on the join/leave request message, and registers an address of the branch router in the sending destination holder.

4. The communication system according to claim 3, wherein the forwarding destination register deletes a forwarding address of the branch router located downstream from the forwarding destination holder based on the join/leave request message from the downstream branch router, and registers, in the forwarding destination holder, the address of the downstream branch router.

5. The communication system according to claim 3, wherein the forwarding destination register registers, in the forwarding destination holder, the forwarding address associated with the source terminal address and the multicast group address, when the multicast-capable router is to be an edge router connecting to a destination terminal.

6. The communication system according to claim 1, comprising a forwarding controller for encapsulating the multicast packet with the forwarding address when a destination address of the decapsulated multicast packet is compared  
5 with the forwarding address held by the forwarding destination holder, and the destination address is different from the forwarding address.
7. The communication system according to claim 1, wherein  
10 the forwarding destination holder holds an address indicating a multicast address group as the forwarding address, when the multicast packet is forwarded to the multicast-capable router connecting to the same subnetwork.
- 15 8. The communication system according to claim 1, comprising a forwarding controller for performing control in a manner of forwarding the multicast packet to the sending address before a change, when the source terminal address is  
20 changed.
9. The communication system according to claim 1, wherein  
25 the source terminal includes an update notification section for providing a location update message which notifies a source terminal address after a change to a destination terminal when the source terminal address is

changed, and

the destination terminal includes a destination terminal  
message provider for providing the source terminal address  
after the change with a join request message which requests  
addition of an address of the destination terminal based  
on the location update message.

10. The communication system according to claim 1, wherein  
the forwarding destination register registers an address  
in the forwarding destination holder based on the join  
request message from the destination terminal or the  
multicast-capable router.

11. A multicast-capable router comprising:

a forwarding destination holder for holding a forwarding  
address to which the multicast-capable router forwards  
a multicast packet;

a forwarding destination register for registering, in the  
forwarding destination holder, an address of another  
multicast-capable router as the forwarding address  
associated with a source terminal address and a multicast  
group address; and

a router message provider for providing the source terminal

address with a join request message which requests addition of the address of the multicast-capable router to a sending address to which the source terminal transmits the multicast packet.

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12. The multicast-capable router according to claim 11, comprising a judgment section for judging whether or not to be a branch router which forwards the multicast packets to the plurality of forwarding addresses when the source terminal address is assumed to be upstream in a multicast tree, wherein

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the forwarding destination register registers, in the forwarding destination holder, the plurality of forwarding addresses associated with the source terminal address and the multicast group address, when the multicast-capable router has been judged to be the branch router, and

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the router message provider provides the source terminal address with a join/leave request message which requests addition of the address of the multicast-capable router to the sending address and deletion of the forwarding address from the sending address, when the multicast-capable router has been judged to be the branch router.

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13. A source terminal comprising:

a sending destination holder for holding a sending address to which a multicast packet is transmitted; and

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a sending destination register for registering, in the sending destination holder, an address of a multicast-capable router as the sending address based on a join request message which requests addition of the address of the multicast-capable router to the sending address.

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14. The source terminal according to claim 13, wherein the sending destination register registers, in the sending destination holder, the address of the multicast-capable router located most upstream when an address of the source terminal is assumed to be upstream in the multicast tree.

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15. The source terminal according to claim 13, wherein based on a join/leave request message which requests to add, to the sending address, the address of the multicast-capable router, which is a branch router forwarding the multicast packets to a plurality of forwarding addresses when an address of the source terminal is assumed to be upstream in the multicast tree, and to delete the forwarding address from the sending address, the sending destination register deletes the forwarding

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address from the sending destination holder, and registers an address of the branch router in the sending destination holder.

- 5      16.    A destination terminal comprising a destination terminal message provider for providing a source terminal address after a change with a join request message which requests addition of an address of a destination terminal to a sending address to which a source terminal transmits a  
10      multicast packet, based on a location update message which notifies the source terminal address after the change when a source terminal address transmitting a multicast packet is changed.

- 15      17.    A communication method comprising:

registering an address of another multicast-capable router, which is associated with a source terminal address and a multicast group address, as a forwarding address  
20      in a forwarding destination holder for holding the forwarding address to which a multicast-capable router transmits a multicast packet;

transmitting, to the source terminal address, a join  
25      request message which requests addition of the address of the multicast-capable router to a sending address to which the source terminal transmits a multicast packet;



and

registering, in a sending destination holder for holding  
the sending address, the address of the multicast-capable  
5 router as the sending address based on the join request  
message.

18. The communication method according to claim 17, wherein  
the source terminal registers, in the sending destination  
10 holder, the address of the multicast-capable router  
located most upstream when the source terminal address  
is assumed to be upstream in a multicast tree.

19. The communication method according to claim 17,  
15 comprising:

judging to be a branch router which forwards the multicast  
packets to a plurality of forwarding addresses when the  
source terminal address is assumed to be upstream in the  
20 multicast tree;

registering, in the forwarding destination holder, the  
plurality of forwarding addresses associated with the  
source terminal address and the multicast group address  
25 when having judged to be the branch router;

transmitting, to the source terminal address, a join/leave

request message which requests addition of the address of the multicast-capable router to the sending address and deletion of the forwarding address from the sending address; and

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deleting the forwarding address from the sending destination holder based on the join/leave request message, and registering an address of the branch router in the sending destination holder.

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20. The communication method according to claim 17, comprising:

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transmitting a location update message which notifies a destination terminal of a source terminal address after a change when a source terminal address is changed; and

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transmitting, to the source terminal address after the change, the join request message which requests addition of an address of the destination terminal to the sending address, based on the location update message.